

## HOST INTERFACE ADAPTIVE HUB STORAGE SYSTEM

### ABSTRACT

A host interface dual active fibre channel adaptive hub includes two fibre channel  
5 arbitrated loops, a loop healing switch coupled to both loops, and four loop resiliency  
circuits. Each loop has a controller and a host server coupled to it through a respective  
loop resiliency circuit. The host servers issue I/O requests to the controllers through the  
dual fibre channel arbitrated loops. Therefore in normal operation, with both loops  
active and both controllers operational, the system provides twice the bandwidth of a  
10 conventional single loop fibre channel arbitrated loop system. The loop resiliency  
circuits detect failures in the controllers. If a loop resiliency circuit detects a failure in a  
controller, the loop resiliency circuit outputs a failure signal to the loop healing switch. A  
failed controller also notifies the loop healing switch that it has failed. The loop healing  
switch then switches to couple the two fibre channel arbitrated loops into a single loop.  
15 Also the loop resiliency circuit switches the failed controller out of the loop. At the same  
time, the surviving controller starts a failover process to claim ownership of all disk  
drives in the system, and present the failed controller's logical units (LUNs) on its host  
port as well as its own LUNs. Using the multiple target ID capability of the controller, the  
surviving controller host port now responds to requests from both host servers by  
20 assuming the arbitrated loop physical address (ALPA) and World Wide Name (WWN)  
of the failed controller in addition to its own ALPA and WWN. Combining the dual fibre  
channel arbitrated loops with the loop healing switch thereby provides both servers an  
access path through the surviving controller to the disk drive array.